



TO: Director, National Institute for Occupational Safety and Health

FROM: Iowa FACE Case No. 2011 IA 043 Report Date: 26 October 2012

SUBJECT: Farmer dies from injuries after being attacked by bull

SUMMARY

In summer 2011, a 53-year-old farmer who worked with her husband in a family dairy operation was injured by a 2 ½-year-old Holstein bull during morning milking chores. On the day of the incident, the victim and her husband began their usual chores: the wife was in the dairy building working cows in the holding pen through the milking parlor to milk, while her husband was in the nearby barn, cleaning the floors with a skid loader. When his wife did not come out of the milking area after starting a group of cows on the milking machines, the husband went into the parlor to check on her. He found her lying near the gate between the holding pen and the milking area. She was unable to move, and told her husband the bull in the holding pen had struck her from behind. The husband moved her into the milking area, secured the cattle in the holding pen, and called 911. First responders arrived and transported the woman to the hospital. The woman was awake and oriented upon arrival but in critical condition with multiple blunt-force injuries and a near-severed spinal cord. Her condition deteriorated, and she died three days later.

The factors contributing to this fatal injury include working alone, and working in an enclosed area where a bull was in the presence of one or more cows likely in estrus.

The following recommendations are made to prevent future occurrences:

1. Maintain constant awareness of the location and behavior of bulls when entering a holding area or pasture. Work with a partner when possible, rather than alone.
2. Recognize scenarios and behaviors indicating that bulls are likely to threaten or attack.
3. Cull bulls from the herd upon first display of aggressive or frenzied behavior toward handlers.

In addition to the specific recommendations above related to this case, dairy producers should warn visitors and others unfamiliar with dairy bulls' potentially aggressive behavior to not enter pastures, holding pens, or corrals where livestock are present. When planning dairy facilities, include a secure

holding facility where bulls can be routed and held during milking, and accessible escape routes or protected areas such as passage gates for working in close quarters with livestock. If economically feasible, consider using artificial insemination to eliminate the need for dairy bulls on site.

INTRODUCTION

A female farmer died after being injured by a young Holstein dairy bull while she was doing the morning milking chores. She was found by her husband within minutes of the injury and was transported by ambulance to a local hospital where she died of her injuries three days later. The Iowa FACE program learned of the fatality from news releases the day following the victim's death and initiated a preliminary investigation. Iowa FACE conducted personal interviews with victim's husband and a visited the farm site. Information from the County Medical Examiner report and the hospital's Department of Pathology autopsy report was used to develop this case study.

INVESTIGATION

The farm wife was injured in a dairy building at her home farm site located 17 miles from the nearest hospital. The New Order Amish couple and their family had been involved in dairy production at this site for 26 years. They owned and operated a 120-cow herd and used 2 bulls to breed their cows. The wife was involved in daily chores, including milking and sorting cattle. She had no impairments of vision, hearing, or mobility. The wife and husband both were reared on farms and participated in farm work as youth. They were aware of the danger of animals with temperamental and aggressive behavior.

Ten years before this attack, the wife was attacked by a dairy bull while out in a pasture with cattle. On that occasion, a bull with 'unpredictable temperament' struck her and knocked her to the ground, injuring her hip. Her husband was able to carry her from the pasture while simultaneously trying to distract the bull by yelling and frightening him. He "thought we'd both be killed trying to get out (of the pasture)," as the bull "went berserk" and maintained its frenzied temperament until it was loaded for slaughter the same day. The farm wife recovered from her hip injuries without complications but became more fearful and cautious around bulls in particular. This was the only prior incident when a bull had attacked anyone at the farm.

The dairy building at the farm was built around 1940 and was remodeled with an addition in 2005. The older section of the building housed milk storage tanks and the milking parlor. The parlor consisted of a below-grade central area oriented east/west where an operator had access to attach milking equipment to cows aligned in two milking areas parallel to, and on either side of the milking equipment. When the family upgraded this building in 2005, they extended the structure to the east from the milking parlor, adding a pen to hold cattle that entered the building from the nearby barn. The holding pen was approximately 26'x46' with a concrete floor, and was set up for cows to enter the central area, and then file into the two milking areas, each accommodating eight cows. A pair of fixed, welded steel gates funneled cows from the holding area into each milking station (Exhibit 1). After they

were milked, the cows exited the milking areas through aisles on either side of the holding pen, and exited the building.

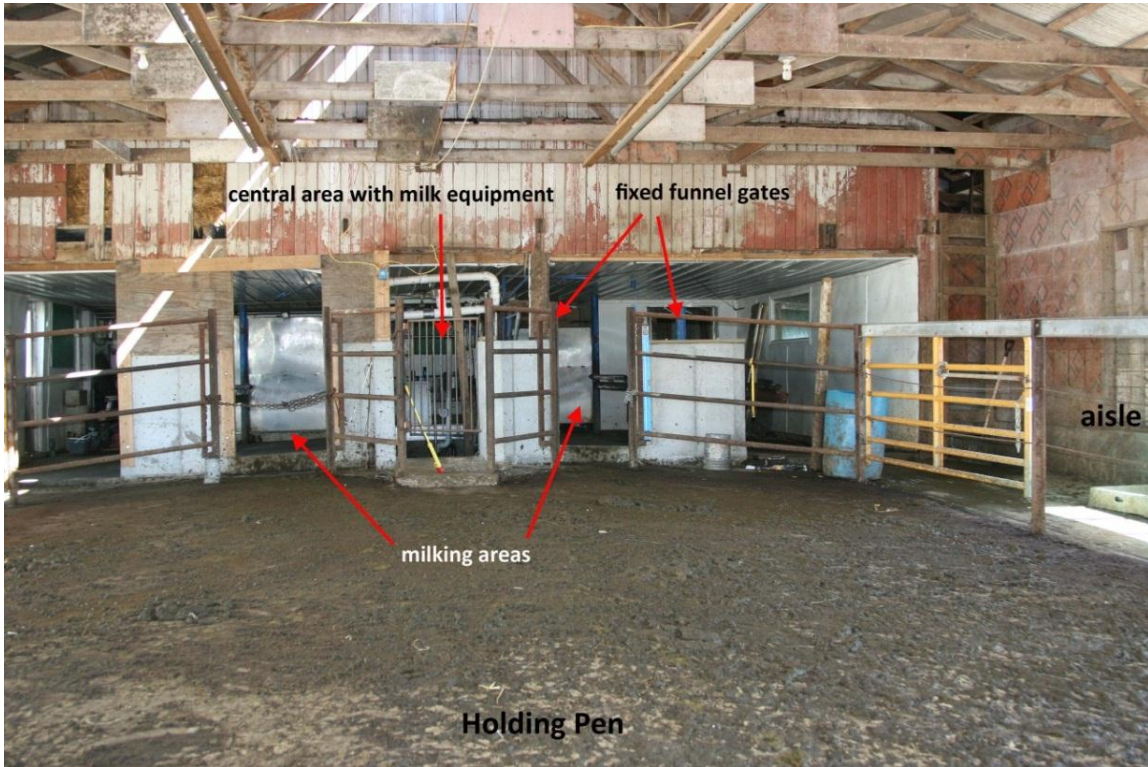


Exhibit 1: View of holding pen area, looking west toward milking area.

The restricted end of each funnel gate had a 'passage gate,' which is a narrow opening configured by the offset section of vertical steel tubing welded to the end of the funnel gate. The passage gate is a design feature providing a protected area, or 'safe zone', on the back side of the funnel gate. A person can move through the passage gate into the protected area to avoid being crushed or squeezed



Exhibit 2: Location of passage gates. The overturned gray bucket on floor represents where a person would be protected if they went through the right-hand passage gate.

against the funnel gate, or struck by an aggressive animal. The narrow width of the passage gate opening prevents an animal from being able to reach the person beyond the passage gate (Exhibit 2).

The daily chores performed by the couple were routine over the years. The wife brought cattle from the nearby barn into the holding area. Cows filed from the holding area into the two open milking areas on either of the milking equipment. The wife secured cows in the two milking areas with metal gates (no longer used at time exhibit photographs were taken) and went into the central area to attach milkers.



Exhibit 3: Path of cows into and out of milking area. Victim was found at gateway where cows enter parlor.

After a group of cows were milked, the wife would turn them out to exit down the exterior aisles (Exhibit 3) and bring a new group into the parlor. While the wife milked cows, her husband used a skid loader to clean the concrete floors of the now-empty barn.

The morning of the incident, the couple started their chores by 0500. The woman had finished milking 16 cows and turned them out. When her husband did not see her come out of the building after starting the next group of cows to milk, he went in to check if she needed help. He found her lying supine on the floor of the holding pen, near the narrow end of the funnel gate area.¹ She was conscious but unable to get up. She told her husband she did not know the 2 ½-year-old Holstein bull was nearby, and that it charged her from behind. The husband moved her into the milking area and secured the metal gate to keep the animals in the holding pen, away from her. At the time the husband found her – ten minutes within her injury - the bull no longer showed aggressive or threatening behavior. The husband ran 60 yards to the house and called 911 at 0548 to provide first responders his rural E911 address, and then returned to the barn. Ambulance crews arrived and transported the victim to the nearest hospital 17 miles away. She was admitted at 0629 in critical condition; she could speak and was oriented, but could not move her legs. She was injured on her head, face, neck, trunk, back, ribs, arms, and legs.

Upon arrival at the hospital the victim was diagnosed with spinal cord edema, near transection of the spinal cord, respiratory failure, multiple fractures and lacerations. Three days following the incident,

¹ The location at the time of the incident is now approximately where the concrete threshold is between the holding and milking areas (Exhibit 3). The metal gates present at the time of the incident have been replaced by concrete partitions and chain, as part of a recent upgrade.

her neurologic status declined and she was put on comfort care. Life support was withdrawn and the victim died later that evening.

CAUSE OF DEATH

The hospital Department of Pathology reported the cause of death as blunt force injuries of the head and neck. The victim also sustained blunt force injuries of the trunk, left arm and legs, and bilateral pulmonary edema.

RECOMMENDATIONS AND DISCUSSION

Recommendation 1. Maintain constant awareness of the location and behavior of bulls when entering a holding pen or pasture. Never attempt to handle a bull alone.

In this incident, the victim was struck from behind and afterwards told her husband she did not know the bull was in nearby. It was not unusual for the bulls to follow the cows from the barn to the holding pen area but on most occasions, they lagged behind and did not enter the pen. Had she noticed the bull in the pen and observed threatening behavior, she could have moved to safety through any of the four passage gates, or called for her husband's assistance to herd the group out into a larger area and confine the bull out with the cows it was following. Her husband indicated she had plenty of areas to escape (i.e., passage gates) in the holding or be protected if she had observed the bull's location and any threatening behavior.

Bulls are the most dangerous of domestic livestock due to their size and unpredictable temperament. Dairy bulls are more dangerous than beef bulls because of the way they are raised: Beef bull calves are usually raised by cows in a social (herd) scenario and consequently imprint on other cattle; when they mature, they challenge each other to exert their dominance in a herd. Dairy bull calves are typically raised in pens, bucket-fed by humans, and consequently lack the opportunity to imprint on other cattle in a social group to establish identity and behavior. By the time the dairy bull becomes sexually mature (around 1.5- 2 years of age), it has imprinted on humans, and will challenge humans for dominance. This may occur in open or enclosed areas, and during activities including feeding, milking, or sorting (MMWR).

A recent review of bull attacks found through online searches, state and university databases found 287 cases of bull attacks from 1987 through 2008, with 194 of those documented in the US; 23 cases occurred in Iowa (Sheldon). Two hundred sixty one cases involved attacks on people; ages of reported victims ranged from 3 to 91 years (mean age 56 years). There were few cases involving youth under 16.² Fifty-seven percent of attacks on people (n=149) resulted in fatalities, but the high ratio of fatal to nonfatal may reflect lack of reporting. Unspecified attacks (n=110) resulted in crushed chest, blunt

² Currently the Agricultural Hazards Occupations Order (AgHO) prohibits youth aged 15 and under from working around bulls and breeding livestock, but children on family farms (i.e. parents are the owners) are exempt from the protection provided by this law.

force trauma and broken ribs, and charging attacks resulted in blunt force trauma, crushed ribs, internal and spinal cord injuries. The study concluded that overconfidence on the part of owners or handlers was a contributing factor for numerous incidents, as victims in some cases were very familiar with the bulls and caught off-guard by their behavior, even when raised from birth or encountered on a daily basis. This observation reinforces the point that hand-raising and perception of familiarity with the animal is not a protective against aggressive behavior of sexually mature animals.

There may be inadequate awareness of the potential dangers associated with handling bulls. A large majority of dairy operations in the US inseminate their cows artificially, instead of with bulls on site, in an effort to save costs of feeding and to increase genetic diversity. Those operations that use bulls for “clean up” or for sole breeding purposes should emphasize training on risks involved with, and safe handling practices for bulls in particular, to counter overconfidence of handlers that have not experienced injury or ‘close calls.’

Recommendation 2. Recognize scenarios and behaviors where animals are likely to threaten or attack.

Non-aggressive behavior

Cattle have wide range panoramic field of vision and can see, and be stimulated by, movement or activities to the side and rear of them. Sudden jerky movements, quick movements, and sudden intermittent or high pitch noises can startle them. Cows, steers, and calves commonly respond to handlers or stimulus based on the stimulus to the animal’s “flight zone” (i.e., personal space). Staying outside an animal’s flight zone causes cattle to stop and turn toward the handler or perceived predator. Animals that are fearful or approached head-on have larger flight-zones. Invading the flight zone causes animals to turn and move away from the handler (or predator). This is a natural predator-avoidance, or fear-based response, and understanding of the flight zone can be used to effectively herd animals when the handler moves ahead or behind the animals “point of balance” – an imaginary line drawn perpendicular to the body, at the shoulders. Being separated from herd mates causes cattle to become agitated.

Aggressive behavior

Male aggressiveness is unrelated to fear-based response described above. Aggressive behavior of mature bulls is based on asserting dominance over a perceived rival (another bull or a human) in the bull’s cow herd. A dominant bull will try to chase away smaller or subordinate rivals from cows the bull wants to breed; bulls raised around humans perceive humans as their subordinate rivals. A bull is more likely to attack a handler if the handler has the scent of another subordinate male on them. From the bull’s perspective, humans that bend low or kneel may be perceived as assuming a threatening pose. Humans that physically position themselves (knowingly or unknowingly) between the bull and a receptive cow (in estrus) are viewed as a rival and are at risk for attack.

Handlers should be aware of signs indicating risk of attack:

- Bulls often do not look at a person prior to charging.

- Bulls performs a ‘broadside threat’ before attacking – by turning sideways to expose it’s full size to the rival, it may lower its head and turn it toward the rival, and flex its neck muscles to show its strength. Showing broadside threat is a warning of a bull attack.
- When bull faces its “threat” head on, it will lowers its head and may paw or stomp the ground, or jab its horns at the ground before charge.
- Bulls may or may not make snorting or vocalizing noises prior to attacking.

When a bull shows threatening behavior, the safest response is to move the head as if to look away from direct eye contact (but still keep watch on the bull) and slowly back away. One should never turn their back on a bull.

In this instance the wife was not audibly warned, and was not aware of, or observing, the bull’s behavior to know she was at risk. Her husband believed she likely placed herself between the bull and a cow in estrus, without realizing it, and thus unknowingly provoked the bull’s response.

Recommendation 3. Cull bulls from the herd upon first display of aggressive or frenzied behavior toward handlers.

The young Holstein bull that fatally injured this farm wife was not raised on site, but was hand-raised by others and purchased locally. It showed no prior aggression at the farm but had recently reached sexual maturity and may only recently have started exhibiting male aggressive behavior toward perceived rivals, including the victim when she was in the holding pen with cows. If, as the husband believed, the bull detected a cow in the pen that had just come into estrus, it would have challenged whatever rival was present. This bull was sold for slaughter the same day of the attack, even though it showed no aggression by the time the husband came to assist his wife. The frenzied bull that attacked the woman ten years earlier was also sold for slaughter the day of the attack.

Bulls raised on bottle are often more aggressive than bulls raised on cow socially in herd with other cattle. While they are young, bulls may seem tame and are scratched or patted. Any contact should be under the chin and neck which keeps the animal in a submissive pose, similar to suckling. Scratching, rubbing or butting on the forehead may trigger butting instincts. When bulls start to reach sexual maturity, contact that may not have been provocative or unsafe while the animal was young becomes risky as the bull now perceives the human as a rival in the herd. Humans unknowingly entering the bull’s territory may instigate (provoke) an attack simply by their proximity to cows in heat. When handlers first observe a mature bull showing tendencies to chase, challenge, or attack, it should be considered dangerous and culled from the herd and sold for slaughter. Culled aggressive bulls should not be sold at auction to other prospective handlers. Male offspring of those bulls should be observed for similar traits as they mature.

Keywords: farmer, livestock, bull attack, struck by animal

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Fatality Assessment and Control Evaluation
FACE

Fatality Assessment and Control Evaluation (FACE) is a program of the National Institute for Occupational Safety and Health (NIOSH), which is part of the Centers for Disease Control and Prevention of the US Department of Health and Human Services. Nationally, the FACE program identifies traumatic work-related deaths, conducts in-depth studies of select cases, makes recommendations for prevention, and publishes reports and alerts. The goal is to prevent occupational fatalities across the nation.

The NIOSH head office in Morgantown, West Virginia, carries out an intramural FACE case surveillance and evaluation program and also funds state-based programs in several cooperating states. The Iowa FACE program is conducted by the Injury Prevention Research Center at the University of Iowa working in conjunction with the Iowa Department of Public Health and its Office of the State Medical Examiner.

NIOSH combines its and the state programs' information for wide dissemination, in a variety of forms, among the industries involved. NIOSH publications are available on the web at <http://www.cdc.gov/NIOSH/FACE/> and from the NIOSH Distribution Center (1-800-35NIOSH).

Iowa FACE also publishes its case studies, issues precautionary messages, and prepares articles for trade and professional publications. In addition to postings on the national NIOSH website, the information is posted on the Iowa FACE website (www.public-health.uiowa.edu/FACE/).

The Iowa FACE team at the University of Iowa includes Marizen Ramirez, Director; Corinne Peek-Asa, Co-Investigator; John Lundell, Co-Investigator; T. Renée Anthony, Co-Investigator; and Stephanie Leonard, Field Investigator. Additional expertise is provided from the Iowa Department of Public Health, including Rita Gergely, Principal Investigator; Kathy Leinenkugel, Surveillance Specialist; and John Kraemer, Director, Forensic Operations at Iowa Office of the State Medical Examiner.

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